RISK TO WATER QUALITY/SOILS OF EASTERN OKLAHOMA:

PERCOLATE CONCENTRATIONS OF NITROGEN AND PHOSPHORUS IN POULTRY LITTER-APPLIED-SOILS OF EASTERN OKLAHOMA

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CHAPTER I

INTRODUCTION

Poultry production in eastern Oklahoma has risen significantly in the last five years. Along with this production is the increasing accumulation of poultry waste. Application of poultry waste or litter (manure plus an absorbing material) on pasture and cropland is the primary method of disposal. Poultry litter application in this region is concentrated in both upland and lowland areas.

The region is a dissected plateau with gently sloped uplands, steep side slopes, and narrow stream and river valleys (lowlands). Poultry application areas initiate or at least contribute to recharge of streams and lakes. Nitrogen and phosphorus are major plant nutrients found in poultry litter. These two elements have been established as consistent factors in controlling undesirable algal growth in lakes and streams, with phosphorus identified as the nutrient most likely to control such growth. Surface-applied poultry litter can contribute to increased amounts of nitrogen and phosphorus in percolates from soils of eastern Oklahoma. Soil percolates will eventually contribute to stream and lake quality.

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CHAPTER II

LITERATURE REVIEW

Introduction

Prior to the early 1950's, farm manure was considered an indispensable resource. Farm manure's nutrient content and ability to maintain soil organic matter levels were important in overall farm management (Salter and Schollenberger, 1939; Oniani et al., 1973).

In spite of some of the advantages of farm manure, there are disadvantages, too. Odors, flies, and nutrient losses are usual problems. Nutrient leaching from farm manure may not represent a significant loss for plant growth but may adversely affect ground water quality. Farmers usually have an abundant supply of manure, or commercial fertilizers for crop production. Leaching losses take on a different perspective when assessing environmental quality. Poultry manure percolate is suspected to cause degradation of water quality in the Illinois River and consequently Tenkiller Ferry Lake (Gakstatter and Katko, 1986). Loss of nutrients by percolation is a significant pathway for fertilization of lakes (Biggar and Corey, 1969).

Nitrogen (N) and phosphorus (P) are two essential plant nutrient elements from poultry manure considered in nutrient loss to the environment. Arsenic (As) may also pose environmental health problems, when poultry manure is added to soils. Nitrate pollution has received considerable recent attention in the United States. Although greatly